

CALIFORNIA GIS STRATEGIC PLAN

Proposed April 1, 2005

Reviewed by the State CIO IT Council *IT Strategic Plan Committee* during May, 2005

Summary

In California, the use of Geographic Information Systems (GIS) is not achieving anywhere near its potential. There is no coherent strategy, statewide coordination or formal authority to ensure the effective use of GIS in this California.

Currently, the state's geospatial data are disorganized, inconsistent, spread across many levels of government and sometimes simply unavailable. As a result, the vast benefits that could be gained from geospatial data applications are largely unrealized. Specific limitations inherent in the current state geospatial data environment include:

- Investment of state resources for geospatial data to meet individual program needs rarely benefits the potentially broader user group and often results in costly duplicative efforts
- The massive geospatial data investments made by local governments throughout California do not benefit the state, even though significant needs for this data exist
- Due to the lack of interagency coordination, the state has a reduced capability to compete for federal geospatial and homeland security grants
- Federal agency geospatial data coordination is constrained by the state's limited ability to participate in federal efforts such as the National Spatial Data Infrastructure (NSDI)¹ and the National Map²
- Private sector value-added geospatial data services that could support and enhance government and private businesses are impeded

Geographic information is necessary for the effective operation of the vast majority of government functions. Use of GIS in California and in states across the nation has time and again resulted in the most effective use of available resources to address individual program mandates and interagency needs. Most other states have already implemented some form of statewide geospatial strategy, providing California with a blueprint of innovative options to address organizational, fiscal, and technical needs of an integrated spatial data infrastructure. Moreover, California's more pronounced geographic, environmental, cultural and economic diversity amplify the potential benefits that other states have achieved with an effective geospatial data management strategy.

Background

Clearly, geographic location matters when it comes to meeting citizen needs: the ability of geospatial data to facilitate government processes covers the entire spectrum, from strategic to operational functions. For example, geospatial data can be used to strategically situate emergency services resources throughout the state, to track the status of these resources during large or multiple events, and to efficiently dispatch personnel and equipment where they are needed most.

Unfortunately, quality geospatial data to support effective state government is lacking in California. Quality data—data that is up-to-date, consistent, accurate, complete and accessible—is expensive to develop and maintain, especially for large and diverse landscapes as in California. Because of fragmentation in management and absence of coordination, the state has no program or process to coordinate the access, capture,

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and maintenance of quality geospatial data.

This situation is due in part to the current system that provides budgets for a specific programmatic need; consideration of broader needs is typically rejected as “mission creep.” Two examples:

- A number of agencies, including the California Department of Forestry and Fire Protection and the California Highway Patrol, are making major investments to improve roads data quality for their specific needs, which is likely to produce limited, if any, benefits to other users.
- An informal survey conducted by the California Department of Transportation in 2003 revealed that various state agencies have purchased licenses for road data from seven separate vendors serving over 9,000 users.

Local governments continue to make substantial investments in quality geospatial data, yet the state is not reaping any benefit from these efforts either. For example, currently all counties either have completed or are in the process of completing digital land records (DLRI) (e.g., parcel-based) information³. Accessing this land records data statewide through a cooperative program would provide critical high-quality information to the state. Instead, current practices involve individual state programs coordinating with counties to secure the data for their specific needs. The end result is that state government, while having a critical need for DLRI, receives very limited benefits from this existing local data source⁴. State coordination is essential for the completion of a “quilt” of geospatial information across California cities and counties.

Government agencies at all levels share the need for common “framework” geospatial data sets. These major functional areas of government depend on the framework data for numerous applications. The table below provides examples of current uses of framework data for a number of major functional areas of state government.

FRAMEWORK DATA SET	FUNCTIONAL AREA				
	Homeland security/public safety	Natural resources	Infrastructure	Health & human services	Economic development, commerce, taxation
Transportation/ Infrastructure	Infrastructure security, location & dispatch of emergency resources	Watershed assessment	Infrastructure planning, traffic flow analysis	Facilities mgmt, emergency medical response	Resource allocation, manufacturing and industrial location
Aerial photography/ satellite imagery	Emergency planning and response	Vegetation mapping, management of coastal resources, mapping and managing mineral resources	Infrastructure planning, water demand planning	Hazardous mineral mapping and remediation	Agricultural land conservation
Boundaries (administrative, jurisdictional)	Mutual aid emergency services	Habitat conservation planning, coordinated resource management planning	Infrastructure planning	Resource allocation	
Hydrography (surface & groundwater)	Flood preparedness and response	Watershed assessment & restoration, oil spill response	Infrastructure planning	Drinking water supplies and ground water contamination	

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FRAMEWORK DATA SET	FUNCTIONAL AREA				
	Homeland security/public safety	Natural resources	Infrastructure	Health & human services	Economic development, commerce, taxation
Land ownership, use, and zoning	Emergency planning and response, post-incident planning	Prioritizing land acquisitions/easements (e.g., ecological reserves, recreation opportunities), flood plain easements, agriculture and open space preservation	Infrastructure planning, natural hazard restrictions to land development	Respond to disease outbreaks, resource allocation	Tax collection by tax rate area, licensing/permitting
Demographics	Identify population density and languages for emergency management		Infrastructure planning	Epidemiology, facility planning, resource allocation	Strategic planning, resource planning, workforce enhancement
Elevation/topography	Flood preparedness and response, simulating fire behavior	Watershed, wind energy, seismic and geologic hazards assessment, air quality modeling, timber harvest plan review	Infrastructure planning		Urban and agricultural land use development, telecommunications
Biodiversity	Mitigation measures for emergency operations	Habitat conservation planning, prioritizing land acquisitions/easements	Infrastructure planning, mitigation		Project mitigation
Land cover/vegetation	Mapping fire risk, simulating fire behavior, flood planning and mitigation	Habitat conservation planning, biomass energy assessment, agricultural land changes, urbanization	Infrastructure planning, mitigation, ground water recharge	Air quality and airborne dust, ground water contamination	Identification, conservation and use of mineral resources

As this table clearly illustrates, investment in framework data via a coordinated strategy will provide widespread and diverse benefits. A common data infrastructure across all levels of government will focus discussions on issues of policy and values, rather than differences in data.

Other states have recognized the benefits of a coordinated geospatial data strategy. A recently completed survey by the National States Geographic Information Council (NSGIC)⁵ shows that **California lags behind most other states with respect to coordinating geospatial activities**. NSGIC identified nine (9) success factors for state government coordination of geospatial efforts. The lack of progress in achieving these success factors underscores the urgent need for statewide geospatial data coordination in California.

NSGIC Success Factor	Status in California
A full-time, paid coordinator position is designated and has the authority to implement the state's business and strategic plans.	California has no such position or function.

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NSGIC Success Factor	Status in California
A clearly defined authority exists for statewide coordination of geospatial information technologies and data production.	California has no such authority .
The statewide coordination office has a formal relationship with the state's Chief Information Officer [, the Governor's cabinet] (or similar office).	California has no such office to coordinate with the Governor's cabinet.
A champion (politician or executive decision-maker) is aware and involved in the process of coordination.	California has no such champion for geospatial matters.
Responsibilities for developing the National Spatial Data Infrastructure and a State Clearinghouse are assigned.	This responsibility has not been formally assigned . However, the CERES program in the California Resources Agency does offer a free, Internet accessible clearinghouse for the cataloging of environmental data, including geospatial data (www.ceres.ca.gov).
The ability exists [for state government] to work and coordinate with local governments, academia and the private sector [on geospatial matters].	Individual state agencies do work and coordinate with local government. The California Resources Agency is a member of the California Geographic Information Association (CGIA). CGIA provides an effective way to work and coordinate with local government and the private sector on geospatial issues. However, there are few incentives and no formal mechanisms for data to flow from local governments to the State for the benefit of the public .
Sustainable funding sources exist to meet projected [geospatial] needs.	No such funding is available in California.
Coordinators have the authority to enter into contracts and become capable of receiving and expending funds [in pursuit of high priority state geospatial projects].	This does not exist in California.
The Federal government works through the statewide coordinating authority.	The California Resources Agency works in partnership with the USGS on <i>The National Map</i> (nationalmap.usgs.gov) through the joint funding of a position. But there is no clear State coordinating entity for the federal government to work through.

State Agency Efforts to Coordinate Geospatial Data

There has been an ongoing effort to coordinate geospatial data activities in California, with some significant results that could provide the building blocks of a successful overall strategy. The primary focus has been to make existing data captured by state programs and other levels of government widely accessible. However, absent the formal support for the importance of geospatial data by successive administrations, fundamental problems remain. Individual programs pursuing their own narrow interests cannot collectively produce the level of investment or standardized data needed to serve the broader user community, and the state has not offered incentives for local government to participate in data coordination and sharing efforts.

A Governor's Geographic Information Task Force convened in 1993 by the Wilson Administration considered the role and importance of geospatial data and technologies in California and what the state should do to make effective use of this technology. This Report of the Geographic Information Task Force (Governor's Office of Planning and Research, April 1993) featured numerous recommendations, including the formation of a coordinating council and creation of a geographic data catalog to improve access to existing data. The report and its recommendations were never formally endorsed by the Wilson administration. However, geospatial data stakeholders at the local and state

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level have attempted to implement several of the recommendations:

CALIFORNIA ENVIRONMENTAL RESOURCES EVALUATION SYSTEM (CERES):

The State established a program within the Resources Agency, the California Environmental Resources Evaluation System (CERES), in 1995⁶. CERES fulfilled one of the Task Force recommendations by developing the Internet-based California Environmental Information Catalog (CEIC). This catalog of environmental data, spatial and otherwise, is a comprehensive source of information on environmental data holdings from both public and private sector organizations. The catalog has over 4,500 geospatial data citations registered by more than 200 agencies and organizations.

CALIFORNIA SPATIAL INFORMATION LIBRARY (CaSIL): The Resources Agency also established the California Spatial Information Library (CaSIL) in 2001 to provide direct Internet access to the most commonly used geospatial data. CaSIL has been an extremely valuable resource to a broad user community, averaging 30 gigabytes of geospatial data downloaded per day.

CALIFORNIA GEOGRAPHIC INFORMATION ASSOCIATION (CGIA): In 1994, Task Force participants attempted to fulfill the need for a coordinating council by establishing the California Geographic Information Association (CGIA)⁷. CGIA received a grant from the Federal Geographic Data Committee and partnered with the Resources Agency to enhance the CEIC. They continue to be active in facilitating the formation of regional GIS councils as part of a larger effort to promote statewide collaboration on GIS matters at all levels of government, the academic community, tribal government, and with the private sector.

CALIFORNIA GIS COUNCIL: The state attempted a more formal effort to create a coordinating council via a memorandum of understanding between the Resources Agency, CalEPA and the now disbanded Department of Information Technology. This effort resulted in the formation of the Statewide GIS Council in 2000. Executive sponsorship of this initial effort waned, but it was reconstituted as the California GIS Council in August 2003.

The California GIS Council is made up of representatives from local, state and federal government agencies that collaborate on the planning, implementation and maintenance of a California geospatial infrastructure. The term "infrastructure" encompasses systems, organizational programs, policy, standards, procedures, and any other factors that affect the ability of member organizations to jointly develop or acquire, share and maintain spatial data.

The Secretary for the Resources Agency is currently a member and the chair of the GIS Council. The Resources Agency has long provided leadership in this area due to the importance of geospatial data and technologies to its programs and the early adoption of GIS by agency departments. A large percentage of GIS activity in state government occurs within Resources Agency organizations.

Regional collaboratives are the organizational building blocks that facilitate the data use coordination essential to the success of the GIS Council's mission. They are composed of representatives of county, city and tribal governments; special districts; utilities; local colleges and universities; and private sector organizations. A survey by CGIA in November 2004, determined more than 15 regional collaborative are actively coordinating GIS among government, utilities, and educational sectors.

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Unfortunately, the recent change of administration and associated turnover of Cabinet members, along with the state's fiscal crisis, has presented serious challenges to the continuation of the GIS Council. There has been a major turnover of state members and sponsors. New state members need to be apprised of their role and responsibilities on the council and the value of this effort. Some continuity has been provided by the persistence of deputy staff that function as "GIS Key Advisors" to the state.

The council adopted a number of policies recommended by the CGIA, including formal recognition and expanded support for CERES as the state's catalogue of geospatial data holdings and support for collaborative development of statewide geospatial framework data. Finally, and most importantly, the Council adopted the following:

"A policy of the Council should be to recommend a centralized state entity with the authority and accountability for coordinating and managing critical geographic information in California."

These GIS Council policies and recommendations are fundamental to enhancing statewide geospatial data coordination, but it has no authority to assure policy implementation.

Implementation

California must develop and implement a statewide geospatial data infrastructure through the coordinated development, maintenance and sharing of geospatial data. This must be accomplished by leading and engaging all levels of government and its partners. The result of these actions will be improved access to high-quality geospatial information that is consistent among state programs and other levels of government. This improved information management paradigm will contribute to improved quality and consistency of service across the entire spectrum of government.

At this time approval of this plan is expect to occur by August 1, 2005. Specific actions for plan implementation are as follows:

- A. *State Geographic Information Officer:* The Governor should establish an office to oversee the implementation of a state geospatial infrastructure. Specific objectives to include:
 1. Within two (2) months of approval of this plan (estimated date October 1, 2005), identify a process and resources needed to implement a California Geospatial Initiative and establish a state government entity (e.g. State Geospatial Information Officer) with the authority, resources, institutional status and responsibility needed to provide state leadership and coordination.
 2. Within five (5) months of approval of this plan (estimated date January 1, 2006), obtain executive sponsorship to begin a California Geospatial Initiative.
 3. Within six (6) months of approval of this plan (estimated date February 1, 2006), establish the office of the State Geospatial Information Officer.
 4. Within seven (7) months of approval of this plan (estimated date March 1 2006), leverage and expand efforts of the California GIS Council and regional GIS councils; develop partnerships with other governmental entities and the

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private sector.

5. Within seven (7) months of approval of this plan (estimated date March 1, 2006), leverage and expand the continuation of the close working relationship that already exists between the United States Geological Survey and the California Resources Agency.
- B. *Geospatial Action Plan*: The new State Geospatial Information Officer should pursue development of geospatial data in support of state government's strategic needs. Specific objectives to include:
1. Within eight (8) months of approval of this plan (estimated date April 1, 2006), start work on the California Geospatial Data Strategy. This ongoing strategic process, to be closely aligned with the state's business strategic planning, will identify geospatial data needs and development priorities with an emphasis on high-priority areas like homeland security.
 2. Within twelve (12) months of approval of this plan (estimated date August 1, 2006), develop the California Geospatial Action Plan to implement the Data Strategy.
 3. Within fifteen (15) months of approval of this plan (estimated date November 1, 2006), begin implementation of the Action Plan.
- C. *Integrated Geospatial infrastructure*: The new State Geospatial Information Officer should pursue creation of an integrated state geospatial infrastructure (e.g., data architecture, systems, standards, processes, regulations, etc.). Specific objectives to include:
1. Within seventeen (17) months of approval of this plan (estimated date December 1, 2006), establish a process to set, adopt and provide training on geospatial data standards consistent with California business needs and Federal standards as appropriate.
 2. Within one (1) month of approval of this plan (estimated date September 1, 2005), develop a process for collecting, integrating, hosting and maintaining geospatial data to share with state and other governmental entities by formally leveraging and expanding existing efforts.
 3. Within one (1) month of approval of this plan (estimated date September 1, 2005), develop a spatial data clearinghouse to make geospatial data discoverable and accessible across the state enterprise, to its partners and the public by formally recognizing, leveraging and expanding existing efforts⁸.
 4. Within six (6) months of approval of this plan (estimated date January 1, 2006), establish a process to ensure conformance with adopted geospatial data standards.

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A timetable for the implementation of this plan follows:

Timetable for Implementation of GIS Strategic Plan

Proposed Actions		FY 2005/06												FY 2006/07											
		J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
	Approve GIS Strategic Plan		X																						
A	ID processes & resources for CA Geospatial Initiative				X																				
	Obtain executive sponsorship							X																	
	Establish office of the GIO								X																
	Endorse & expand CA GIS Council efforts/partnerships									X															
	Endorse & expand USGS partnership									X															
B	Develop CA Geospatial Data Strategy										X														
	Develop CA Geospatial Action Plan														X										
	Begin implementation of CA Geospatial Action Plan																	X							
C	Begin training on geospatial data standards																		X						
	Leverage & expand GIS library			X																					
	Leverage & expand GIS catalog/clearinghouse			X																					
	Establish process to conform to geospatial data standards							X																	

Fiscal Impact

Like most strategic investments, there is an upfront cost to begin implementation, with a larger return on investment to be realized in the future.

There is an estimated 200 dedicated geospatial practitioners in state government thinly scattered across many programs. In most cases, it is not feasible to redirect these staff without doing harm to the programs they serve. However, there are some programs and staff already providing agency wide GIS coordination and support services that could be redirected to a larger, enterprise level effort. For example, the CERES Program provides technical support to the Resources Agency and its director also serves as the Agency Information Technology Officer involved with a broad range of IT activities.

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Conclusion

To more effectively leverage its limited resources, California must establish a coordinated interagency geospatial data management program. The resulting data infrastructure will allow California government agencies to improve their responsiveness, efficiency and effectiveness in a wide range of arenas, from homeland security, emergency services, education and health services to environmental protection, economic development and infrastructure management.

The basic building blocks are there. It is time for leadership from the top to put California on a par with other states that are realizing the full potential of GIS to meet the needs of its citizens.

Endnotes

¹ The National Spatial Data Infrastructure <http://www.fgdc.gov/nsdi/nsdi.html>

² The National Map <http://nationalmap.usgs.gov>

³ California Digital Land Records Implementation Status, Needs, and implementation Options, June 2004, Appendix C: The availability of digital land records from California Counties <http://gis.ca.gov/council/documents.epl>

⁴ California Digital Land Records Implementation Status, Needs, and implementation Options, June 2004, Section 2 Existing Land Records Environment within State Government <http://gis.ca.gov/council/documents.epl>

⁵ National States Geographic Information Council.. <http://www.nsgic.org/>

⁶ California Environmental Resources Evaluation System www.ceres.ca.gov

⁷ California Geographic Information Association <http://www.cgia.org/>

⁸ California Spatial Information Library <http://www.gis.ca.gov>